In the column "compositions of sintered body", the contents of Sm_2O_3, the rare earth oxide and Al_2O_3 were calculated based on the contents obtained by chemical analysis of Sm, rare earth element and oxygen, according to the following procedure.

(Content of Sm2O3 : mole percent)

The content of Sm is determined by ICP analysis and then converted to the content of Sm2O3.

(Converted content of second rare earth element calculated as oxide)

The content of a rare earth element (Re) is determined by ICP analysis. The content is then converted to the content of Re2O3. When the rare earth element is cerium, the content of cerium is converted to the content of CeO2.

(Content of Al2O3)

The total content of oxygen in the sintered body is determined by infrared absorptiometry. Both of the oxygen contents in Sm2O3 and in the second rare earth oxide were subtracted from the total content of oxygen to calculate the remaining oxygen. The content of Al2O3 was calculated under the provision that all the remaining oxygen atoms constitute Al2O3.

(Content of AlN : mole percent)

The contents of Sm2O3, the oxide of the second rare earth element and Al2O3 calculated as described above were subtracted from 100 (mole percent) to provide the content of AlN. Each content of each component was represented using "mole percent" as a unit. This calculation is performed under the provision that total of the contents of AlN, Sm2O3, Al2O3 and the oxide of the second rare earth element is 100 mole percent.

(Ratio of the second rare earth element / Sm2O3)

The molar ratio of the content of the oxide of the second rare earth

element (converted amount as the oxide) to the content of Sm2O3 (converted content as the oxide) was calculated.

(Ratio of total of contents of all the rare earth oxides / Al2O3)

The molar ratio of total of the contents of all the rare earth oxides to the content of Al2O3 was calculated.

Table 10

	open porosity %	bulk density g/cm3	resistivity 25 ℃ Ω・cm	resistivity 300℃ Ω・cm	activation energy eV	bending strength MPa	thermal conductivity W/mK	average grain diameter of AlN μm	crystalline phase (excluding AlN)
example 22	0.01	3.29	6.E+11	5.E+08	0.38	539	103	3	$SmAlO_3$,$SmAl_{11}O_{18}$,$Yb_3Al_5O_{12}$
example 23	0.02	3.29	2.E+11	2.E+08	0.37	501	107	4	$SmAlO_3$,$SmAl_{11}O_{18}$,$Yb_3Al_5O_{12}$
example 24	0.01	3.28	2.E+11	3.E+08	0.35	452	98	4	$SmAlO_3$,$SmAl_{11}O_{18}$
example 25	0.02	3.29	3.E+12	2.E+09	0.39	420	103	4	$SmAlO_3$,$SmAl_{11}O_{18}$
example 26	0.03	3.31	3.E+12	2.E+09	0.39	448	118	5	$SmAlO_3$,$SmAl_{11}O_{18}$
example 27	0.01	3.28	1.E+12	1.E+09	0.37	448	111	4	$SmAlO_3$,$SmAl_{11}O_{18}$,$Y_3Al_5O_{12}$
example 28	0.02	3.28	4E+12	3E+09	0.39	512	101	4	$SmAlO_3$,$SmAl_{11}O_{18}$
example 29	0.04	3.29	5.E+12	3.E+09	0.40	429	106	4	$SmAlO_3$,$SmAl_{11}O_{18}$
example 30	0.03	3.29	5.E+12	4.E+09	0.38	525	100	3	$SmAlO_3$,$SmAl_{11}O_{18}$
example 31	0.01	3.29	7.E+12	4.E+09	0.40	494	108	4	$SmAlO_3$,$SmAl_{11}O_{18}$
example 32	0.02	3.29	1.E+12	2.E+09	0.33	521	102	3	$SmAlO_3$,$SmAl_{11}O_{18}$,$Er_3Al_5O_{12}$
example 33	0.03	3.29	2.E+12	2.E+09	0.37	506	114	4	$SmAlO_3$,$SmAl_{11}O_{18}$,$Er_3Al_5O_{12}$
Comparative example 9	0.01	3.30	1.E+14	4.E+09	0.54	427	104	4	$SmAlO_3$,$SmAl_{11}O_{18}$
Comparative example 10	0.02	3.33	1.E+16	2.E+11	0.58	343	107	4	$SmAlO_3$